IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Johnny Zhong et al.	)
Serial No.:	10/724,426	)
Filed:	November 26, 2003	)
Confirmation No.	1047	)
For:	OPTICAL ADD/DROP MODULE	) Art Unit) 2883
Examiner:	Eric K. Wong	)
Appeal No.:	_____	)

The Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

BRIEF OF APPELLANT

This is an appeal to the Board of Patent Appeals and Interferences (the "Board") from the Final Office Action mailed December 11, 2006 (the "Final Office Action") wherein the Examiner rejected claims 6-11, 13-21, 23, and 24. This Brief is being filed pursuant to the provisions of 37 C.F.R. § 41.37. This Brief is accompanied by the requisite fee of $500.00, as provided by 37 C.F.R. § 41.20(b)(2). The Commissioner is hereby authorized to charge any additional fees associated with this communication, or to credit any overpayment, to Deposit Account No. 23-3178.

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LIST OF REFERENCES

U.S. PATENT DOCUMENTS

U.S. Patent No. 6,871,022 to *Xu*
U.S. Patent No. 6,278,818 to *Laming, et al.*

I. REAL PARTY IN INTEREST

The real party in interest comprises FINISAR CORPORATION, by way of assignment from Johnny Zhong, Steve Wang, and Yin Zang. The corresponding assignment document was recorded in the United States Patent and Trademark Office at Reel/Frame 014753/0034 on November 26, 2003. The named inventors, Johnny Zhong, Steve Wang, and Yin Zang, who are captioned in the present application, assigned their interest in the present application to FINISAR CORPORATION.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIMS

Claims 12 and 22 have been canceled and claims 1-5 and 25-27 have been withdrawn from consideration. Claims 6-11, 13-21, 23, and 24 were rejected in the Final Office Action mailed December 11, 2006 (the "Final Office Action"). Indicated status of claims is as of the mailing date of the Final Office Action. Claims 6-11, 13-21, 23, and 24 are being appealed.

IV. STATUS OF AMENDMENTS

The Appellant has not submitted any amendments subsequent to the Final Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER

It should be noted that nothing in the following discussion is intended, nor should be used, to construe the scope or meaning of any of the claims. Rather, the following discussion, and corresponding references to the specification and figures, are provided solely for informational purposes so as to comply with the formal requirements of 37 CFR § 41.37(c)(1)(v).

In the example of claim 6, an optical add/drop module for adding and dropping one or more channels from a wavelength division multiplexed (WDM) signal includes a drop portion (401) and an add portion (413). *See, e.g.*, pages 14 and 15, paragraphs [0038]-[0041]; *see also* Figure 4. The drop portion (401) includes a plurality of thin film filters (404, 408, 410, and 412). Each thin film filter (404, for example) drops a particular channel (λ_1, for example) from a WDM signal (the WDM signal that initially includes the channels λ_1, λ_2, λ_3, λ_4, λ_5, λ_6, λ_7, and λ_8, for example). The add portion (413) adds channels of the WDM signal dropped by the drop portion (λ_1, λ_3, λ_5, and λ_7) back to the WDM signal. The add portion includes a first stage (414) and a final stage (422). Each interleaver (416 or 418) in the first stage (414) is a fused-fiber interleaver. The final stage (422) includes a thin film interleaver (424) that has a flat-top frequency response. *See, e.g.*, page 15, paragraphs [0042] and [0043].

In the example of claim 15, an optical add/drop module for adding and dropping one or more channels from a coarse wavelength division multiplexed (CWDM) signal includes a drop (401) portion and an optical add portion (413). *See, e.g.*, pages 14 and 15, paragraphs [0038]-[0041]; *see also* Figure 4. The drop portion (401) is configured to extract at least one optical channel (λ_1, for example) from a multiplexed optical signal (the WDM signal that initially includes the channels λ_1, λ_2, λ_3, λ_4, λ_5, λ_6, λ_7, and λ_8, for example). The optical add portion (413)

includes a plurality of interleavers (416, 418, and 423) disposed in stages (414 and 420) in a cascade arrangement. The stages of the optical add portion further include a final stage (422) that interleaves the most densely packed channels. *See, e.g.*, pages 14 and 15, paragraph [0040]. The final stage (422) including a thin film interleaver (424) with a flat-top frequency response. *See, e.g.*, page 15, paragraphs [0042] and [0043].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Issue 1: Whether claims 6-11, 13, and 14 are unpatentable, under 35 U.S.C. §103(a), as being obvious over U.S. Patent No. 6,871,022 to Xu ("*Xu*") in view of U.S. Patent No. 6,278,818 to Laming et al. ("*Laming*").

Issue 2: Whether claims 15-21, 23, and 24 are unpatentable, under 35 U.S.C. §103(a), as being obvious over *Xu* as applied to claims 6-11, 13, and 14 and further in view of what the Examiner has characterized as "applicant's disclosure of the prior art" (*see Final Office Action* at 4).

VII. ARGUMENT

A. Issue 1: Whether claims 6-11, 13, and 14 are unpatentable, under 35 U.S.C. §103(a), as being obvious over *Xu* in view of *Laming*.

It is well settled that in order to establish a *prima facie* case of obviousness, it is the burden of the Examiner to demonstrate that three criteria are met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *M.P.E.P. § 2143*. For at least the reasons set forth below however, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 6-11, 13, and 14.

i. Claim 6

a. The Examiner has failed to establish that the cited references, when combined, teach or suggest all the limitations of rejected claim 6

As noted in both Applicant's paper filed on September 22, 2006 ("*Applicant's September 22, 2006 Paper*") and Applicant's Pre-Appeal Brief Request for Review ("*Applicant's Pre-Appeal Brief Request*"), the Examiner has failed to establish that the cited references, when combined, teach or suggest all the limitations of rejected claim 6. *Applicant's September 22, 2006 Paper*, at 8-9; *Applicant's Pre-Appeal Brief Request*, at 2-3. For example, in the Office Action mailed May 22, 2006, the Examiner rejected claim 6, asserting that:

> Xu discloses in Figures 6, 16A-B, and 19A-B, an optical add/drop module ... comprising [a] drop portion ... [and an] add portion ... wherein the add portion comprises: [a] first stage of interleavers ... and a final stage including a thin film interleaver ...

Office Action mailed May 22, 2006, at 2. In response, Applicant argued that:

> ...the Examiner failed to identify which component(s) of *Xu* are purported to constitute the alleged "drop portion," "add portion," "first stage of interleavers" and "final stage" recited in the rejection....
>
> Instead, the Examiner has relied on little more than a single vague reference to the *Xu* figures in support of the rejection of claims 6-11 and 13-14. Thus, the Examiner has left Applicant to guess at which component(s) of Xu are believed by the Examiner to correspond with the elements of the rejected claims. This much, Applicant respectfully declines to do, at least because the Examiner bears the burden of establishing, prima facie, the obviousness of the claims.

Applicant's September 22, 2006 Paper, at 8. In the Final Office Action, the Examiner repeated, verbatim, the rejection of claim 6 (compare *Final Office Action* at 4, and Office Action mailed May 22, 2006 at 2-3), and then responded to Applicant's argument by asserting that:

> Applicant's arguments filed 9/22/2006 have been fully considered but they are not persuasive. In regards to the claim group 6-11 and 13-14, Applicant argues that the Examiner relies on little more than a single vague reference to Xu figures to support the rejection of claims 6-11 and 13-14. Applicant points out this vagueness with respect to the add/drop portions of the invention. Examiner respectfully disagrees. Examiner believes that while terse, the indication of figures is appropriate. As one of ordinary skill in the optical multiplexing or demultiplexing art would be able to determine, for example, in figure 19A, that an add/drop function is taking place.
>
> ....
>
> Applicant further argues and recites a quote from MPEP706 noting that Examiner must cite and designate parts applicable to applicant's invention, **if not apparent** (emphasis added). As noted above, Examiner believes that it would be apparent to one of ordinary skill in the art and that one of ordinary skill in the art would be able to recognize from the figures alone and the brief description of the figures in Xu, the claimed features of applicant's invention.

Final Office Action, at 2-3 (emphasis in original).

As exemplified by these statements, the Examiner has consistently failed to *specifically identify* the component(s) of *Xu* that the Examiner believes to correspond with the elements of rejected claim 6, and has instead simply relied on vague references to the art. Moreover, Applicant respectfully submits that the Examiner is mistaken in suggesting that his burden with respect to identification of the claimed features in the cited art is discharged because "...one of ordinary skill in the art would be able to recognize from the figures alone and the brief

description of the figures in Xu, the claimed features of applicant's invention." *See Final Office Action*, at 3 (emphasis added).

Rather, the Examiner must make the disclosure of such features apparent not to a hypothetical person of ordinary skill in the art but, rather, to the Applicant. The examination guidelines confirm this, stating that "In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified." 37 CFR 1.104 (emphasis added). Moreover, "[t]he goal of examination is to clearly articulate any rejection early in the prosecution process so that the *applicant* has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." MPEP § 706 (emphasis added).

Clearly, the Examiner has not discharged the burden imposed by the aforementioned examination guidelines. At the outset, Applicant notes that the Examiner has offered nothing more than bare allegations as to what "one of ordinary skill" would purportedly be able to glean from the references. That is, the Examiner has advanced no evidence or argument that one of ordinary skill would, or could, come to the conclusions that the Examiner has advanced with respect to the purported teachings of the cited references.

Moreover, inasmuch as the Examiner has provided little or no insight as to the correspondence that the Examiner believes to exist between the cited references and the elements of the rejected claims, the rejection is deficient in that the Examiner has failed to specifically identify the purportedly obvious combination. That is, because the Examiner has not shown which elements of *Xu* are purported to correspond to the elements recited in the claims, it is

unclear to Applicant as to the specific manner in which the Examiner believes that the *Xu* device would be modified to include the element purportedly disclosed in *Laming*, and it is also unclear to Applicant as to what the configuration of the *Xu* device, thus modified, would be.

Since the position of the Examiner has never been properly articulated (the Examiner has conceded the "terse[ness]" of the rejections set forth in the Office Actions - *see, e.g., Final Office Action* at 2), Applicant is at a loss to submit responsive argument and/or amendments, and would be compelled to resort to guesswork in order to do so. Clearly, the approach taken by the Examiner with respect to examination of the claims of this application does not afford, and has not afforded, Applicant the opportunity to "...provide evidence of patentability and otherwise reply completely at the earliest opportunity." *See, Id.* In fact, the approach taken by the Examiner has denied Applicant such opportunity altogether.

Moreover, the attempt of the Examiner to justify such an approach to examination is inadequate. For example, the Examiner has asserted that "As one of ordinary skill ... would be able to determine, for example, in Figure 19A, that an add/drop function is taking place..." that "..column 4, lines 49-51 further define this figure to be 'block diagram of an **interleaver** performing an **add/drop** function'..." (emphasis in original), and that "...column 13, lines 38-53 provide further detail as to how the interleaver functions as an add/drop module." *Final Office Action* at 2. Notwithstanding these assertions however, claim 6, for example, does not merely recite "...an interleaver performing an add/drop function..." Rather, claim 6 recites a number of additional specific limitations that the Examiner has simply failed to establish are disclosed in, or even suggested by, the cited references.

In particular, the Examiner has failed to establish that the combination of the cited portions of *Xu* and *Laming* results in an "optical add/drop module" comprising "a drop portion

comprising a plurality of thin film filters, wherein each thin film filter drops a particular channel from a WDM signal" and "an add portion that adds channels of the WDM signal dropped by the drop portion back to the WDM signal" where the add portion comprises "a first stage of interleavers, wherein each interleaver in the first stage is a fused-fiber interleaver" and "a final stage including a thin film interleaver, wherein the thin film interleaver has a flat-top frequency response" as required by the rejected claim 6. (Emphasis added).

Moreover, none of the figures of *Xu* cited by the Examiner (FIGs. 6, 16[], 19A, and 19B) appears to disclose an "add/drop module" that includes a "drop portion comprising a plurality of thin film filters, wherein each thin film filter drops a particular channel from a WDM signal" *and* an "add portion that adds channels of the WDM signal *dropped by the drop portion* back to the WDM signal" as required by claim 6.

For at least the foregoing reasons, Applicant respectfully submits that the Examiner has failed to establish that the cited references, when combined, teach or suggest all the limitations of rejected claim 6.

b. The Examiner has failed to establish that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or *would be led in a direction divergent from the path that was taken by the applicant*." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)(emphasis added). "[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be

non-obvious." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1739-40 (2007), *citing U.S. v. Adams*, 383 U. S. 39, 51-52 (1966). *Emphasis added.*

As noted in both *Applicant's September 22, 2006 Paper* and *Applicant's Pre-Appeal Brief Request*, the rationale of the Examiner that underlies the claim rejection, namely that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, stands in plain contradiction to the disclosure of *Xu*. *See Applicant's September 22, 2006 Paper*, at 8-10; *Applicant's Pre-Appeal Brief Request for Review*, at 3-4. In particular, *Xu* actually *teaches away* from the combination of *Xu* and *Laming* proposed by the Examiner.

For example, in Applicant's September 22, 2006 Paper, Applicant argued that:

> As to the purportedly obvious modification and alleged motivation for that combination, the Examiner has conceded that "Xu fails to explicitly disclose the use of a 'fused fiber' interleaver but does disclose that interleavers are conventionally made by fusing together two optical fibers ..." and then goes on to assert that "Laming teaches a channel add/drop multiplexer using a fused optical fiber coupler to extract (drop) a specified wavelength . . . It would have been obvious ... to use the fused optical fibers of Laming as the interleavers of Xu for the motivation of reducing cost, bulk and to lower insertion losses."
>
> Notwithstanding these allegations by the Examiner, it would appear that, in fact, *Xu* teaches away from the combination proposed by the Examiner. For example, *Xu* discloses a "fused biconical taper (FBT) fiber coupler" about which *Xu* states that "[u]nfortunately, the FBT [fused biconical taper] coupler is only suited for separating channels whose wavelengths are relatively far apart. To achieve the multi-window WDMs or small channel spacing, it is necessary to significantly increase the length of the fused and tapered region, which has presented significant difficulties in manufacturing." *Col. 2, lines 9-14. Emphasis added.*
>
> In light of this teaching in *Xu*, it seems clear that one of ordinary skill would not be inclined to use the "fused optical fibers" of *Laming* as the interleavers for *Xu*, such as the Examiner has alleged would be obvious to do.

Applicant's September 22, 2006 Paper, at 9 (emphasis in original). In the *Final Office Action*, the Examiner responded to this argument by asserting that:

> Applicant further argues the basis of Examiner's motivation and use of the Laming reference, noting that Xu teaches away from the combination proposed by the Examiner. Examiner respectfully disagrees. Xu discloses that fused fiber interleavers are well known.
>
> Finally, Applicant argues that the combination of Xu and Laming teaches away from the combination proposed by Examiner. Examiner respectfully disagrees. Examiner thanks Applicant for pointing out multiple sections of the MPEP, but would like to direct Applicant to MPEP 2142.02, 2143.01, and 2145D. Prior art must be considered in its entirety, including disclosures that teach away from the claims.
>
> As to Xu teaching away from the use of a fused fiber interleaver because of manufacturing difficulties, Laming teaches a fused fiber interleaver that does not appear to result in manufacturing difficulties. Examienr [*sic*] believes this provides proper motivation to use the teachings of Laming in the invention of Xu.

Final Office Action, at 3. Notwithstanding these assertions, Applicant notes at the outset that the Examiner has failed to establish that the *Laming* fused-fiber coupler overcomes the "difficulties" identified in *Xu* as being associated with the fused-fiber couplers that are characterized by *Xu* as being problematic. *See Xu*, at column. 2, lines 9-14. That is, the bare allegation of the Examiner that the *Laming* fused-fiber coupler 'does not appear to result in manufacturing difficulties' (as characterized by the Examiner) is, without more, simply inadequate to establish that the *Laming* fused-fiber couplers do not also suffer from the same problems that *Xu* indicates make fused-fiber couplers undesirable.

In addition, it was noted previously by Applicant (*see Applicant's September 22, 2006 Paper*, at 9) that *Xu* teaches away from the use of "fused biconical taper (FBT) fiber coupler" in devices that accommodate signals with "small channel spacing." *See Xu*, at column 2, lines 9-14. It is therefore unlikely that one of skill in the art would be motivated to use fused-fiber couplers, such as the Examiner has indicated are disclosed in *Laming*, in the devices of *Xu*, given that *Xu* purports to be concerned with devices that accommodate signals with relatively small channel spacing. *See, e.g.*, column 7, lines 16-17 ("This design is suited for WDMs with a *smaller channel spacing*...")(emphasis added); *see also* column 15, lines 14-18 ("In this way, thin film

filters as well as other WDM devices with wide channel spacing can be used in combination with interleavers to separate channels with *narrow channel spacing*...") (emphasis added).

Finally, while the Examiner has alleged that "It would have been obvious...to use the fused optical fibers of Laming as the interleavers of Xu for the motivation of reducing cost, bulk and to lower insertion losses.", the Examiner has not provided any argument or evidence whatsoever, whether from the cited references or elsewhere, in support of this bare allegation. Applicant respectfully submits that facts, rather than mere allegations, are necessary to establish the existence of a motivation to combine reference teachings.

c. The Examiner has failed to establish that there is a reasonable expectation of success in implementing the purportedly obvious combination

In view of the difficulties attributed by *Xu* to the use of fused fiber interleavers in the applications and devices contemplated by *Xu*, it is not apparent that there is a reasonable expectation that modification of the *Xu* device to include the *Laming* fused fiber interleaver would prove to be successful. In fact, given the concerns expressed in *Xu* with regard to the use of fused fiber interleavers, the modification proposed by the Examiner, though unclear to the Applicant, may in fact compromise the functionality of the *Xu* device. Thus, there would be no reason for one of ordinary skill in the art to make the purportedly obvious combination advanced by the Examiner.

For at least the foregoing reasons, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 6. Accordingly, the rejection of claim 6 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

ii. Claims 7-11, 13, and 14

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 6. By virtue of their dependence from claim 6, claims 7-11, 13, and 14 each require an "optical add/drop module" comprising "a drop portion comprising a plurality of thin film filters, wherein each thin film filter drops a particular channel from a WDM signal" and "an add portion that adds channels of the WDM signal dropped by the drop portion back to the WDM signal" where the add portion comprises "a first stage of interleavers, wherein each interleaver in the first stage is a fused-fiber interleaver" and "a final stage including a thin film interleaver, wherein the thin film interleaver has a flat-top frequency response." (Emphasis added).

As discussed above in connection with claim 6 however, even if the references are combined in the purportedly obvious fashion advanced by the Examiner, whatever that fashion may be, the Examiner has failed to establish that the resulting combination includes all the limitations of claim 6, or that there is a motive to make the combination proposed by the Examiner, or that there is a reasonable expectation that the allegedly obvious modification of the *Xu* device would be successful.

As in the case of the rejection of claim 6, the Examiner has again failed, in the *Final Office Action* (*see*, e.g, pages 4-5), to *specifically identify* the component(s) or other features of *Xu* that the Examiner believes to correspond with the elements of rejected claims 7-11, 13, and 14. In particular, though the Examiner has alleged that various teachings are included in the references, Examiner has failed to identify, with any specificity whatsoever, where the following purported teachings are allegedly disclosed in the references: "an add/drop module with a thin film interferometer would inherently be able to add or drop channels" (claims 7-8); "light is

reflected and transmitted in multiple vectors" (claim 9); "multiple channels are used" (claim 10); "flat top frequency is optimized" (claim 11); "channel isolation and suppressed crosstalk is achieved" (claim 13); and, "optical spacers are used to construct the WDM interleaver" (claim 14). *See*, e.g., *Final Office Action* at pages 4-5.

In the interest of brevity, Applicant notes that this approach to the examination of claims 7-11, 13, and 14 is problematic for at least the same reasons set forth in the discussion of claim 6 at VII.A.i.a above, and Applicant respectfully directs the attention of the Board to that discussion.

Similar to the rejection of claim 6, the Examiner has likewise failed to establish the existence of a suggestion or motivation for making the purportedly obvious combinations so as to arrive at the inventions of claims 7-11, 13, and 14, and, the Examiner has failed as well to establish that there is a reasonable expectation that the purported reference teachings would or could be successfully combined so as to arrive at the inventions of claims 7-11, 13, and 14. In the interest of brevity, Applicant notes that the rejections of claims 7-11, 13, and 14 are thus problematic for the same reasons set forth in the discussion of claim 6 at parts VII.A.i.b/c above. Accordingly, Applicant respectfully directs the attention of the Board to that discussion.

For at least the reasons set forth above, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 7-11, 13, and 14. Accordingly, the rejection of claims 7-11, 13, and 14 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

B. Issue 2: Whether claims 15-21, 23, and 24 are unpatentable, under 35 U.S.C. §103(a), as being obvious over *Xu* as applied to claims 6-11, 13, and 14 and further in view of "applicant's disclosure of the prior art"

As discussed below, the Examiner has also failed to establish a *prima facie* case of obviousness with respect to claims 15-21, 23, and 24.

i. Claim 15

a. The Examiner has failed to establish that the cited reference, when combined with "applicant's disclosure of the prior art," teaches or suggests all the limitations of rejected claim 15

The Examiner has failed to establish that the cited reference, when combined with what the Examiner has characterized as "applicant's disclosure of the prior art," teaches or suggests all the claim limitations required by rejected claim 15. For example, in the Final Office Action, the Examiner rejected claims 15-21, 23, and 24, asserting that:

> Claim 15-21, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu as applied to claims above, and further in view of applicant's disclosure of prior art.
>
> Xu discloses a thin film based add/drop optical module using interleavers, but fails to explicitly disclose the method of Coarse Wavelength Division Multiplexing (CWDM).
>
> Applicant discloses in the background of the invention that WDM, DWDM and CWDM are commonly used in the art of multiplexing in order to increase bandwidth using multiple interleavers.

Final Office Action, at 5. However, despite the Examiner's allegations, the Examiner has failed to even assert, much less establish, that the references, when combined in the purportedly obvious fashion, disclose an "optical add/drop module" comprising "a drop portion configured to extract at least one optical channel from a multiplexed optical signal" and "an optical add portion" comprising "a plurality of interleavers disposed in stages, the stages in a cascade arrangement" and "a final stage that interleaves the *most densely packed channels*, the final stage including a thin film interleaver with a flat-top frequency response" as recited in claim 15. *Emphasis added.*

For example, the Examiner has once again failed to *specifically identify* the component(s) of *Xu* that the Examiner believes to correspond with the elements of rejected claim 15. Rather, and as noted above, the rejection of claim 15 by the Examiner is based largely on the characterization of *Xu* advanced by the Examiner in connection with the rejection of claim 6 ("Claim 15-21, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu as applied to claims above, and further in view of applicant's disclosure of prior art." *Final Office Action* at 5) (emphasis added).

Insofar as the Examiner has, in rejecting claim 15, relied on the characterization of *Xu* advanced by the Examiner in connection with the rejection of claim 6, Applicant respectfully submits that the rejection of claim 15 lacks merit for at least the reasons set forth in connection with the discussion of claim 6 at VII.A.i above. Rather than repeating that discussion here, Applicant, in the interest of brevity, respectfully directs the attention of the Board to that discussion.

Applicant notes as well that the reliance of the Examiner, in rejecting claim 15, on the characterization of *Xu* advanced by the Examiner in connection with the rejection of claim 6 (*see Final Office Action* at 5) is unavailing to establish obviousness of the invention of claim 15, at least insofar as the invention to which claim 6 is directed is different from the invention to which claim 15 is directed. A few examples will serve to illustrate this point.

In particular, claim 15 recites "...a final stage that interleaves the most densely packed channels, the final stage including a thin film interleaver with a flat-top frequency response." In contrast, claim 6 recites "...a final stage including a thin film interleaver, wherein the thin film interleaver has a flat-top frequency response." Clearly, the "final stage" recited in claim 6 is different from the "final stage" recited in claim 15, and yet the Examiner has failed to assert,

much less establish, that the references disclose the "final stage" recited in claim 15. As another example, claim 15 recites "...an optical add portion comprising: a plurality of interleavers disposed in stages, the stages in a cascade arrangement..." In contrast, claim 6 recites "...an add portion that adds channels of the WDM signal dropped by the drop portion back to the WDM signal, wherein the add portion comprises a first stage of interleavers, wherein each interleaver in the first stage is a fused-fiber interleaver..." As in the preceding example, claim 15 is clearly different from claim 6. Nonetheless, the Examiner has failed to assert, much less establish, that the cited references disclose the arrangement recited in claim 15, and the Examiner instead relies on the characterization of *Xu* advanced in connection with the rejection of claim 6. The foregoing examples thus illustrate that the reliance of the Examiner on that characterization of *Xu* is unavailing to demonstrate the obviousness of claim 15.

b. The Examiner has failed to establish that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings

The Examiner has indicated that the rationale for rejecting claim 15 is that it would have been obvious "...to configure the WDM of Xu to allow for use with a CWDM signal disclosed by applicant as a matter of obvious design choice based on its intended use and to increase bandwidth for the module of Xu." *Final Office Action* at 4. *Emphasis added.* Applicant notes at the outset that inasmuch as the Examiner appears to be alleging that the combination is obvious because it is obvious, such reasoning is circular, and therefore constitutes an inadequate basis for rejecting the claims.

Applicant notes further that *Xu* indicates at column 7, lines 16-17 that "This design is suited for WDMs with a *smaller channel spacing*..." (emphasis added). *See* also column 15,

lines 14-18 of *Xu* ("In this way, thin film filters as well as other WDM devices with wide channel spacing can be used in combination with interleavers to separate channels with *narrow channel spacing*...") (emphasis added). In light of the fact that *Xu* purports to be concerned with a device for use with "narrow channel spacing," it is not apparent why one of ordinary skill would be motivated to modify the *Xu* device for operability with coarse wavelength division multiplexing (CWDM) applications, such as the Examiner has alleged would be obvious to do.

c. The Examiner has failed to establish that there is a reasonable expectation of success in implementing the purportedly obvious combination

As noted above, *Xu* purports to be concerned with devices for use with "narrow channel spacing." Accordingly, it is not apparent, nor has the Examiner provided evidence or argument to the contrary, that there is a reasonable expectation that modification of the *Xu* device to operate with CWDM applications would prove to be successful. In fact, modification of the *Xu* device to operate with CWDM applications, such as the Examiner has alleged would be obvious to do, might well impair the ability of the *Xu* device to operate in connection with "smaller channel spacing" applications.

For at least the foregoing reasons, including the reasons set forth above at VII.A.i, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 15. Accordingly, the rejection of claim 15 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

ii. Claims 16-21, 23, and 24

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 15. By virtue of their dependence from claim 15, claims 16-21, 23, and 24 each require an "optical add/drop module" comprising "a drop portion configured

to extract at least one optical channel from a multiplexed optical signal" and "an optical add portion" comprising "a plurality of interleavers disposed in stages, the stages in a cascade arrangement" and "a final stage that interleaves the *most densely packed channels*, the final stage including a thin film interleaver with a flat-top frequency response." (Emphasis added).

As discussed above in connection with claim 15 however, even if the references are combined in the purportedly obvious fashion, whatever fashion that may be, the Examiner has nonetheless failed to establish that the resulting combination includes all the limitations of claim 15, or that there is a motive to make the combination proposed by the Examiner, or that there is a reasonable expectation that the allegedly obvious modification of the *Xu* device would be successful.

As in the case of the rejection of claim 15, the Examiner has again failed, in the *Final Office Action* (*see*, e.g, pages 5-7), to *specifically identify* the component(s) or other features of *Xu* that the Examiner believes to correspond with the elements of rejected claims 16-21 and 23-24. In fact, the Examiner has completely failed to even allege, much less establish, that the specific limitations recited in dependent claims 16-21 and 23-24 are taught or suggested by the cited references. A few examples will serve to illustrate this point.

With reference to claim 16, for example, that claim recites "...wherein the drop portion comprises a plurality of thin film three-port devices." Claims 18-20 similarly require such "thin film three-port devices." However, nowhere in the *Final Office Action* is there any mention of such "thin film three-port devices."

As another example, claims 21 and 22 require "...wherein the flat-top frequency response is essentially constant over a bandwidth about a defined carrier channel wavelength." Again, however, the *Final Office Action* makes no mention whatsoever of the "flat-top frequency

response" required by claims 21 and 22, and instead simply alleges that *Xu* discloses "flat-top frequency response is optimized" (*see Final Office Action* at 5, referring to claim 11).

In still another example, claim 23 recites "...wherein the final stage exhibits isolation of channels at a bandwidth edge." However, the *Final Office Action* makes no reference to the "final stage" required by claim 23, and instead simply alleges that "channel isolation and suppressed crosstalk is achieved" (*see Final Office Action* at 5, referring to claim 13).

As a final example, claim 24 requires a thin film interleaver that comprises "...a plurality of cavities, each cavity comprising one or more thin film layers and a spacer; and a final cavity comprising a spacer that comprises a matching layer designed with an index of refraction intended to match the thin film interleaver to surrounding air or to another device." Again, however, the *Final Office Action* makes no reference to a "thin film interleaver" configured in such fashion, but instead makes only the vague allegation that "optical spacers are used to construct the WDM interleaver" (*see Final Office Action* at 5, referring to claim 14).

In the interest of brevity, Applicant notes that this approach to the examination of claims 16-21, 23, and 24 is problematic for at least the same reasons set forth in the discussion of claim 6 at VII.A.i.a above, and Applicant thus respectfully directs the attention of the Board to that discussion.

Similar to the rejection of claim 15, the Examiner has likewise failed to establish the existence of a suggestion or motivation for making the purportedly obvious combinations so as to arrive at the claimed inventions of claims 16-21, 23, and 24. The Examiner has failed as well to establish that there is a reasonable expectation that the purported reference teachings would or could be successfully combined so as to arrive at the inventions claimed in claims 16-21, 23, and 24. In the interest of brevity, Applicant notes that the rejections of claims 16-21, 23, and 24 are,

accordingly, problematic for the same reasons set forth in the discussion of claim 15 at parts VII.B.i.b/c above. Accordingly, Applicant respectfully directs the attention of the Board to that discussion.

For at least the reasons set forth above, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 16-21, 23, and 24. Accordingly, the rejection of claims 16-21, 23, and 24 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

CONCLUSIONS

Based on the foregoing, Appellant respectfully submits that the rejections of the claims are not well taken. Accordingly, Appellant respectfully requests that the Board reverse the Examiner's rejections of claims 6-11, 13-21, 23, and 24 pending in this application and thereby place this application in condition for immediate allowance.

DATED this the 16th day of October, 2007.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. **(Withdrawn)** An optical add/drop module for adding and dropping one or more channels from a wavelength division multiplexed (WDM) signal; the optical add/drop module comprising:

a drop portion configured to extract at least one optical channel from a multiplexed optical signal; and

an add portion having a plurality of stages including final stage in a cascade arrangement, each stage having at least one fused fiber interleaver, wherein the final stage that interleaves the most densely packed channels comprises a first fused fiber interleaver in series with a second fused fiber interleaver.

2. **(Withdrawn)** The optical add/drop module of claim 1, wherein the drop portion comprises a plurality of thin film filter interleavers.

3. **(Withdrawn)** The optical add/drop module of claim 2, wherein at least one of the thin film filter interleavers is configured to reflect a channel the multiplexed optical signal with a thin film filter while allowing other channels of the multiplexed optical signal to pass through the thin film filter.

4. **(Withdrawn)** The optical add/drop module of claim 2, wherein at least one of the thin film filter interleavers is configured to allow a channel from the multiplexed optical signal to pass through a thin film filter while reflecting other channels.

5. **(Withdrawn)** The optical add/drop module of claim 1, wherein at least one of the thin film filter interleavers is configured to deinterleave channels in the multiplexed optical signal by reflecting a plurality of channels using a thin film filter while allowing a plurality of channels to pass through the thin film filter.

6. **(Previously presented)** An optical add/drop module for adding and dropping one or more channels from a wavelength division multiplexed (WDM) signal, the optical add/drop module comprising:

a drop portion comprising a plurality of thin film filters, wherein each thin film filter drops a particular channel from a WDM signal;

an add portion that adds channels of the WDM signal dropped by the drop portion back to the WDM signal, wherein the add portion comprises:

a first stage of interleavers, wherein each interleaver in the first stage is a fused-fiber interleaver; and

a final stage including a thin film interleaver, wherein the thin film interleaver has a flat-top frequency response.

7. **(Original)** The optical add/drop module of claim 6, wherein each thin film filter of the drop portion is configured to reflect a particular channel from the WDM signal while allowing other channels to pass through the thin film filter.

8. **(Original)** The optical add/drop module of claim 6, wherein each thin film filter of the drop portion is configured to allow a particular channel to pass through the thin film filter while reflecting other channels.

9. **(Original)** The optical add/drop module of claim 6, wherein at least one of the thin film filters of the drop portion is configured to deinterleave a multiplexed signal by allowing a first group of channels to pass through the thin film filter while reflecting a second group of channels.

10. **(Original)** The optical add/drop module of claim 9, wherein each group of channels comprises alternating channels.

11. **(Original)** The optical add/drop module of claim 6, wherein the flat-top frequency response is essentially constant over a bandwidth about a defined carrier channel wavelength.

12. **(Canceled)**

13. **(Original)** The optical add/drop module of claim 6, wherein the final stage exhibits isolation of channels at a bandwidth edge.

14. **(Original)** The optical add/drop module of claim 6, the thin film interleaver comprising:

a plurality of cavities, each cavity comprising one or more thin film layers and a spacer; and

a final cavity comprising a spacer that comprises a matching layer designed with an index of refraction intended to match the thin film interleaver to surrounding air or to another device.

15. **(Original)** An optical add/drop module for adding and dropping one or more channels from a coarse wavelength division multiplexed (CWDM) signal, the optical add/drop module comprising:

a drop portion configured to extract at least one optical channel from a multiplexed optical signal; and

an optical add portion comprising:

a plurality of interleavers disposed in stages, the stages in a cascade arrangement; and

a final stage that interleaves the most densely packed channels, the final stage including a thin film interleaver with a flat-top frequency response.

16. **(Original)** The optical add/drop module of claim 15, wherein the drop portion comprises a plurality of thin film three-port devices.

17. **(Original)** The optical add/drop module of claim 16, wherein each thin film three-port device of the drop portion is configured to reflect a particular channel from the CWDM signal while allowing other channels to pass through the thin film three-port device.

18. **(Original)** The optical add/drop module of claim 16, wherein each thin film three-port device of the drop portion is configured to allow a particular channel to pass through the thin film three-port device while reflecting other channels.

19. **(Original)** The optical add/drop module of claim 16, wherein at least one of the thin film three-port devices of the drop portion is configured to deinterleave a multiplexed signal by allowing a first group of channels to pass through the thin film three-port device while reflecting a second group of channels.

20. **(Original)** The optical add/drop module of claim 19, wherein each group comprises alternating channels.

21. **(Original)** The optical add/drop module of claim 15, wherein the flat-top frequency response is essentially constant over a bandwidth about a defined carrier channel wavelength.

22. **(Canceled)**

23. **(Original)** The optical add/drop module of claim 15, wherein the final stage exhibits isolation of channels at a bandwidth edge.

24. **(Original)** The optical add/drop module of claim 15, the thin film interleaver comprising:

a plurality of cavities, each cavity comprising one or more thin film layers and a spacer; and

a final cavity comprising a spacer that comprises a matching layer designed with an index of refraction intended to match the thin film interleaver to surrounding air or to another device.

25. **(Withdrawn)** An optical add/drop module for adding and dropping one or more channels from a coarse wavelength division multiplexed (CWDM) signal, the optical add/drop module comprising:

a drop portion the drop portion configured to extract at least one optical channel from a multiplexed optical signal;

an add portion, the add portion having a plurality of stages in a cascade arrangement, each stage comprising at least one fused fiber interleaver; and

a fused fiber interleaver in a final stage, the fused fiber interleaver in the final stage being less sensitive to temperature changes.

26. **(Withdrawn)** The optical add/drop module of claim 25, comprising a ceramic sleeve disposed about the fused fiber interleaver in the final stage.

27. **(Withdrawn)** The optical add/drop module of claim 25, the ceramic sleeve having a thermal coefficient of expansion that is opposite in magnitude to a thermal coefficient of expansion of the fused-fiber device.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None (*see* II. above).